IN THE UNITED STATES PATENT OFFICE

Application No.: 10/654,508
Filing Date: September 3, 2003
Inventors: Deroover Geert, Van Damme Marc, Vermeersch Joan
Applicant: Agfa Graphics NV
Examiner: Connie P. Johnson
Art Unit: 1752
Attorney Docket No.: 224105

Title of the Application: HEAT-SENSITIVE LITHOGRAPHIC PRINTING PLATE PRECURSOR

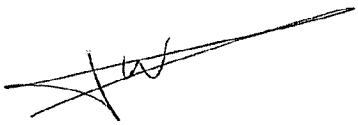
DECLARATION UNDER 37 C.F.R. § 1.132 FROM LINGIER Stefaan

Stefaan Lingier declares as follows:

1. That he obtained a doctorate in chemistry from the Rijks Universiteit Gent in Ghent, Belgium, in 1990, is presently employed in the Research laboratories at Agfa Graphics NV in Mortsel, Belgium and has been carrying out research in the field of lithographic printing plate recording materials since 2003.
2. That he is familiar with the above identified application and the pending claims, the Office Action of the United States Patent Office dated June 22, 2007 and the references cited therein.
3. That he has had carried out under his supervision the Examples 1 to 7 as described in the appendix of this declaration.
4. That he has the opinion, based on the experiments as described in the appendix, that the printing plate precursors comprising an infrared dye having 3 or 4 solubilizing groups as defined in the application, exhibit a high IR-sensitivity and a small Dmin-value, resulting in no stain during printing, and that, when the infrared dye comprises at most 2 or at least 6 solubilizing groups, the printing plate precursors do not provide this combined advantage of high speed and low stain.
5. That all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, that these statements were made with the knowledge that willful false statements and the like so made are

punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: September 3, 2007.



Stefaan Lingier

Appendix to the declaration under 37 C.F.R. § 1.132 from Lingier Stefaan dated September 3, 2007:

EXAMPLES 1 TO 7

Preparation of the support:

A 0.30 mm thick aluminum foil was degreased by immersing the foil in an aqueous solution containing 34 g/l of sodium hydroxide at 70°C for 6 seconds and rinsed with demineralized water for 3.6 seconds. The foil was then electrochemically grained during 8 seconds using an alternating current in an aqueous solution containing 15 g/l HCl, 15 g/l SO_4^{2-} ions and 5 g/l Al^{3+} at a temperature of 37°C and a current density of 100 A/dm^2. The aluminum foil was then desmutted by etching with an aqueous solution containing 145 g/l of sulfuric acid at 80°C for 5 seconds and rinsed with demineralized water for 4 seconds. The foil was subsequently subjected to anodic oxidation during 10 seconds in an aqueous solution containing 145 g/l of sulfuric acid at a temperature of 57°C and a current density of 25 A/dm^2, then washed with demineralized water for 7 seconds and post-treated for 4 seconds with a solution containing 2.2 g/l of polyvinylphosphonic acid at 70°C, rinsed with demineralized water for 3.5 seconds and dried at 120°C for 7 seconds.

The support thus obtained was characterized by a surface roughness Ra of 0.35-0.40 μm (measured with interferometer NT1100) and an anodic weight of 3.0 g/m^2.

Preparation of the plate precursors

The solutions in the table below were coated on the above support at a wet coating thickness of 20 μm on a coating line at a speed of 10.8 m/min using drying temperatures of 135°C.

Imaging and developing and printing

The materials were then imaged on a Creo Trendsetter 3244 (830 nm) using different energy density settings (intensity at the image plane) in the range from 90 mJ/cm^2 up to 220 mJ/cm^2. The plates were then processed in an Agfa Autolith PN85 processor operating at a speed of 0.96 m/min using Agfa DP300 developer at 25°C and finally gummed with Agfa Ozasol RC795 (diluted for 50%).

The IR-sensitivity (hereinafter also referred to as "speed") of the different compositions corresponds to the minimum energy density setting that is required to obtain a 50% reduction of the light absorption of the coating, measured with a GretagMacbeth D19C densitometer, commercially available from Gretag-Macbeth AG, with the uncoated support as reference, on

the developed plate at the wavelength maximum of the contrast dye, in areas which have been exposed with a 1x1 checkerboard.

Dmin is defined as the optical density on the plate, exposed at an energy density of 90 mJ/cm^2, and processed as described above. The optical density is measured with a GretagMacbeth D19C densitometer, commercially available from Gretag-Macbeth AG, with the uncoated support as reference. A high Dmin value results in an insufficient clean-out and will induce stain during printing.

The plates were printed on a Heidelberg GTO52 sheetfed printing press and a print job was started using K+E Novavit 800 Skinnex ink (trademark of BASF Drucksysteme GmbH) and 100% Rotamatic (trademark of Rotaprint) as fountain solution, a compressible blanket and uncoated offset paper.

The results of these measurements are summarized in the table below.

Table: Composition of the printing plate precursors and results of the Examples 1 to 7

Ingredients (g)	Example 1 (Comp.)	Example 2 (Comp.)	Example 3 (Inv.)	Example 4 (Inv.)	Example 5 (Inv.)	Example 6 (Inv.)	Example 7 (Comp.)
THF (1)	206.00	206.00	206.00	206.00	206.00	206.00	206.00
Alvonol (2)	144.10	144.10	144.10	144.10	144.10	144.10	144.10
Dowanol (3)	167.70	167.70	167.70	167.70	167.70	167.70	167.70
MEK (4)	263.00	263.00	263.00	263.00	263.00	263.00	263.00
C1	1.95	-	-	-	-	-	-
IR-6	-	1.95	-	-	-	-	-
IR-3	-	-	1.95	-	-	-	-
IR-4	-	-	-	1.95	-	-	-
IR-5	-	-	-	-	1.95	-	-
IR-7	-	-	-	-	-	1.95	-
IR-8	-	-	-	-	-	-	1.95
Contrast(5)	132.00	132.00	132.00	132.00	132.00	132.00	132.00
Tego (6)	27.78	27.78	27.78	27.78	27.78	27.78	27.78
TMCA (7)	50.05	50.05	50.05	50.05	50.05	50.05	50.05
IR sensitivity (mJ/cm2)	171	201	<90	100	<90	<90	nbd
Dmin	0.019	0.026	0.011	0.022	0.016	0.029	0.202

Stain (+ = stain, - = no stain)	-	-	-	-	-	-	+
Number of solubilizing groups in IR-dye	0	2	3	3	3	4	6

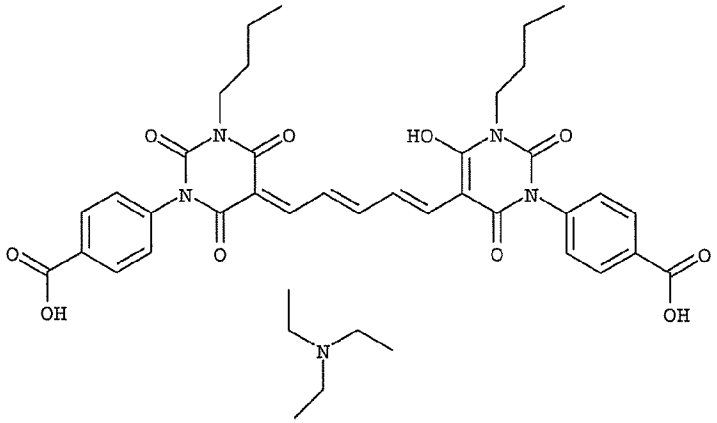
(1) THF is tetrahydrofuran;

(2) Alvonol SPN452 is a 40.5% solution in Dowanol PM (commercially available from Clariant);

(3) Dowanol is Dowanol PM, 1-methoxy-2-propanol, commercially available from Dow Chemical Company;

(4) MEK is butanone;

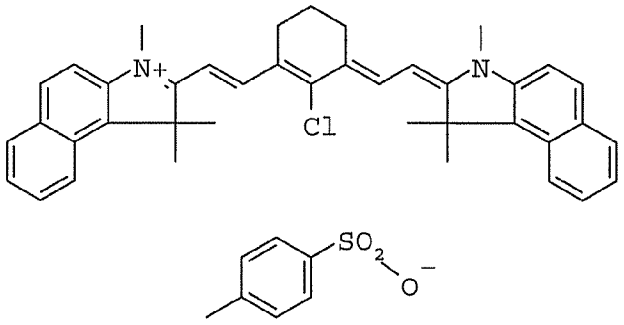
(5) Contrast is 1% w/w solution in Dowanol of the following non-inhibiting dye:



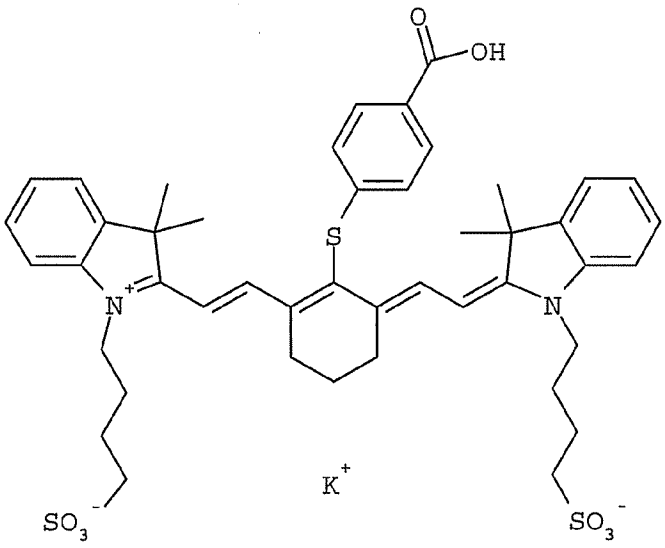
(6) Tego is a 1 wt.% solution in Dowanol of Tego Glide 410, a surfactant commercially available from Tego Chemie, Essen, Germany;

(7) TMCA is a 10 wt.% solution of 2,3,4-trimethoxy-cinnamic acid in Dowanol.

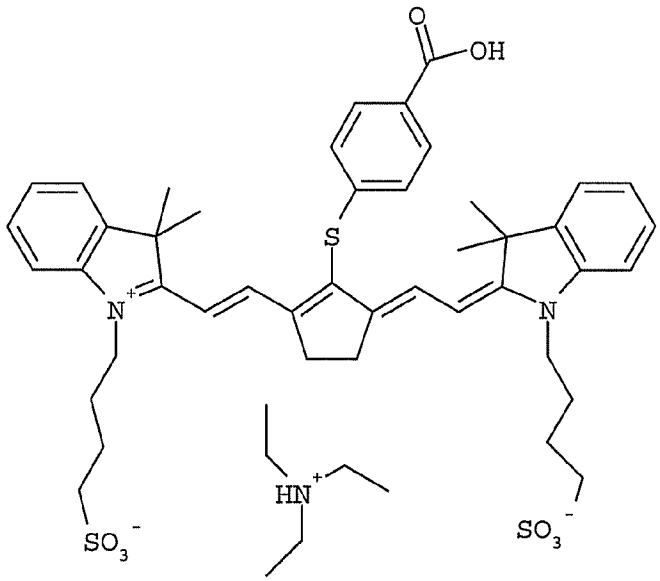
C1 (this comparative IR-dye is the same as in the application):



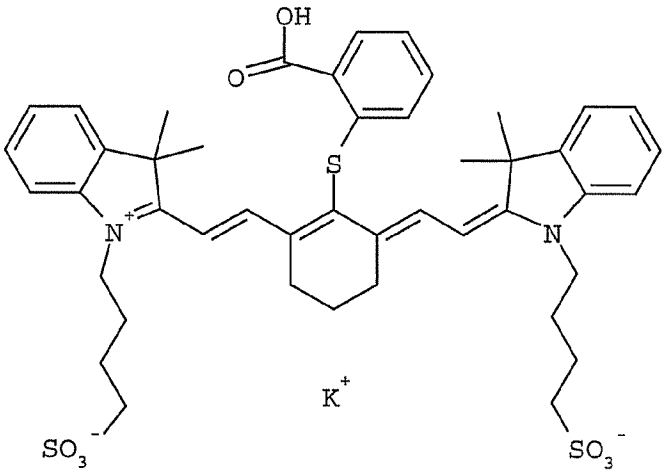
IR-3 (this IR-dye is the same as in the application):



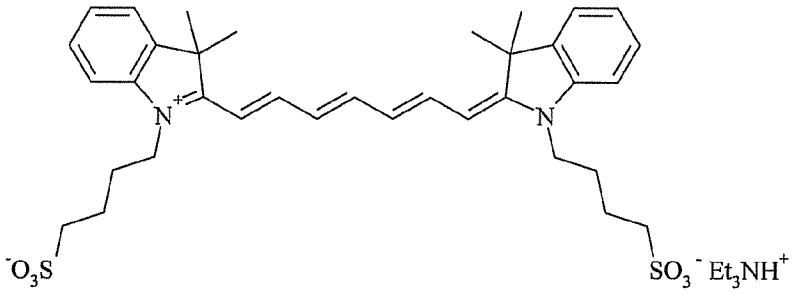
IR-4 (this IR-dye is the same as in the application):



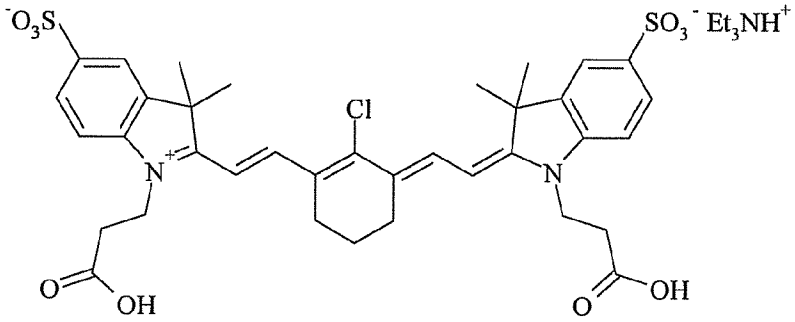
IR-5 (this IR-dye is the same as in the application):



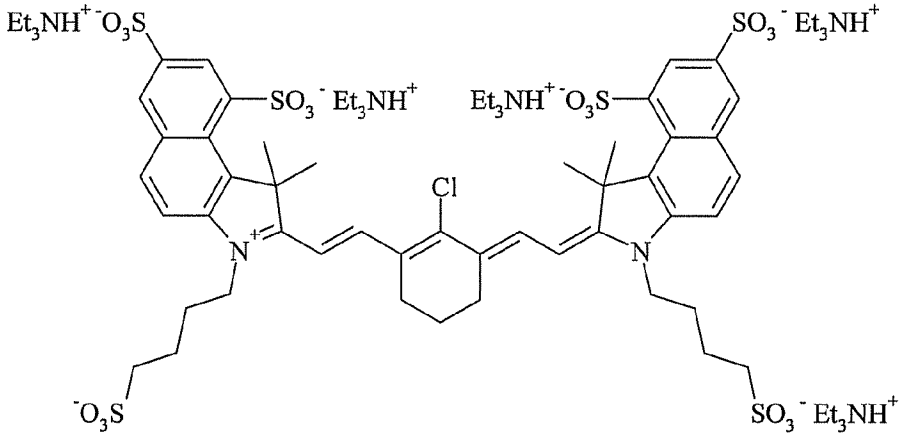
IR-6 (this is another comparative IR-dye having 2 solubilizing groups):



IR-7 (this is another invention IR-dye, analogue to IR-2 of the application but having Z^3 in formula I of the application as a 6-membered ring):



IR-8 (this is another comparative IR-dye having 6 solubilizing groups):



Conclusion:

The plate precursors of the Invention Examples 3 to 6, having an infrared dye which contains 3 or 4 solubilizing groups such as IR-3, IR-4, IR-5 or IR-7, exhibit a high speed (energy density $\leq$100 mJ/cm^2). In addition to this high sensitivity, these plates exhibit on the exposed areas an excellent clean-out as indicated by the small value for Dmin (< 0.03) and by absence of stain during printing.

On the contrary, the printing plate precursors of the Comparative Examples 1 and 2, having an infrared dye which contains no or only 2 solubilizing groups such as C1 and IR-6, exhibit a low stain but not a high speed (energy density > 170 à 200 mJ/cm^2) and these plates do not provide the combined advantage of high speed and low stain.

For the printing plate precursor of the Comparative Example 7, having an infrared dye which contains 6 solubilizing groups such as IR-8, an inhomogeneous coating is observed resulting in an insufficient clean-out as measured by the high Dmin-value > 0.2 such high that the speed can not be determined ("nbd") and will be > 220 mJ/cm^2. As a result of this insufficient clean-out, stain is observed for this plate on printing.